



# Low-Dimensional Conductors and Superconductors

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# Low Dimensional Conductors And Superconductors

**Jean-Pierre Farges**



## **Low Dimensional Conductors And Superconductors:**

**Low-Dimensional Conductors and Superconductors** D. Jerome, L.G. Caron, 2013-12-14 Research activities in low dimensional conductors have shown a rapid growth since 1972 and have led to the discovery of new and remarkable physical properties unique to both molecular and inorganic conductors exhibiting one dimensional transport behaviour This NATO Institute was a continuation of a series of NATO Advanced Study Institutes of Workshops which took place at regular intervals till 1979 This is the first time however that charge density wave transport and electronic properties of low dimensional organic conductors are treated on an equal footing The program of the Institute was framed by tutorial lectures in the theories and experiments of low dimensional conductors The bulk of the course covered two series of low dimensional materials with their respective properties 1 The 1D inorganic conductors exhibiting the phenomena of sliding charge density waves narrow band noise memory effects etc 2 Low dimensional crystallized organic conductors giving rise to various possibilities of ground states spin Peierls spin density wave Peierls superconductivity and magnetic field induced spin density wave etc Since it has been established from the beginning that this Institute was to be devoted essentially to the Physics of Low Dimensional Conductors only one main course summarized the progress in chemistry and material preparation **Low**

**Dimensional Conductors and Superconductors** I. D. Parker, 1988 **Electron-Electron Correlation Effects in Low-Dimensional Conductors and Superconductors** Alexandr A. Ovchinnikov, Ivan I. Ukrainskii, 2012-12-06 Advances in the physics and chemistry of low dimensional systems have been really magnificent in the last few decades Hundreds of quasi one dimensional and quasi two dimensional systems have been synthesized and studied The most popular representatives of quasi one dimensional materials are polyacetylenes CH<sub>1</sub> and conducting donor acceptor molecular crystals TTF z TCNQ Examples of quasi two dimensional systems are high temperature superconductors HTSC based on copper oxides La<sub>2</sub>CuO<sub>4</sub> YBa<sub>2</sub>Cu<sub>3</sub>O<sub>6-y</sub> and organic superconductors based on BEDT-TTF molecules The properties of such one and two dimensional materials are not yet fully understood On the one hand the equations of motion of one dimensional systems are rather simple which facilitates rigorous solutions of model problems On the other hand manifestations of various interactions in one dimensional systems are rather peculiar This refers in particular to electron-electron and electron-phonon interactions Even within the limit of a weak coupling constant electron-electron correlations produce an energy gap in the spectrum of one dimensional metals implying a Mott transition from metal to semiconductor state In all these cases perturbation theory is inapplicable Which is one of the main difficulties on the way towards a comprehensive theory of quasi one dimensional systems This meeting held at the Institute for Theoretical Physics in Kiev May 15-18 1990 was devoted to related problems The papers selected for this volume are grouped into three sections Interaction Effects in Low-dimensional Conductors and Superconductors Dmytro Pesin, 2009 **Proceedings of the European Conference on Low Dimensional**

**Conductors and Superconductors ; 3**, 1989 The Physics of Organic Superconductors and Conductors Andrei

Lebed,2008-03-26 This bang up to date volume contains the distilled wisdom of some of the world s leading minds on the subject Inside there is a treasure trove of general tutorial and topical reviews written by leading researchers in the area of organic superconductors and conductors The papers hail from all over the world as far afield as the USA and Australia They cover contemporary topics such as unconventional superconductivity non Fermi liquid properties and the quantum Hall effect

**Advances in Organic Conductors and Superconductors** Martin Dressel,2018-10-04 This book is a printed edition of the Special Issue Advances in Organic Conductors and Superconductors that was published in Crystals **The Physics of Superconductors** Karl-Heinz Bennemann,John B. Ketterson,2011-06-27 This is the second volume of a comprehensive two volume treatise on superconductivity that represents the first such publication since the earlier widely acclaimed books by R Parks It systematically reviews the basic physics and recent advances in the field Leading researchers describe the state of the art in conventional phonon induced superconductivity high Tc superconductivity and in novel superconductivity including triplet pairing in the ruthenates The second volume is largely concerned with novel superconductors such as heavy fermion metals and organic materials and also includes granular superconductors Important new results on current problems are presented in a manner designed to stimulate further research Numerous illustrations diagrams and tables make this book especially useful as a reference work for students teachers and researchers Volume 1 treats Conventional and High Tc Superconductors 3 540 43883 1 **Transport in Low-dimensional Conductors** Marina M. Hruška,2003 **Density**

**Waves In Solids** George Gruner,2018-03-08 Density Waves in Solids is written for graduate students and scientists interested in solid state sciences It discusses the theoretical and experimental state of affairs of two novel types of broken symmetry ground states of metals charge and spin density waves These states arise as the consequence of electron phonon and electron electron interactions in low dimensional metals Some fundamental aspects of the one dimensional electron gas and of the materials with anisotropic properties are discussed first This is followed by the mean field theory of the phases transitions discussed using second quantized formalism together with the various experimental observations on the transition and on the ground states Fluctuation effects and the collective excitations are reviewed next using the Ginzburg Landau formalism followed by the review of the interaction of these states with the underlying lattice and with impurities The final chapters are devoted to the response of the ground states to external perturbations *Organic Conductors* Jean-Pierre Farges,2022-09-16 This work examines all aspects of organic conductors detailing recent theoretical concepts and current laboratory methods of synthesis measurement control and analysis It describes advances in molecular scale engineering including switching and memory systems Schottky and electroluminescent diodes field effect transistors and photovoltaic devices and solar cells Dynamics of Magnetic Fluctuations in High-Temperature Superconductors George Reiter,Peter Horsch,Gregory C. Psaltakis,2012-12-06 This NATO Advanced Research Workshop was held at a time when there was little consensus as to the mechanism for high temperature superconductivity in the context of a world undergoing major changes

in its political alignments and sense of the possibility for the future It was characterized by generosity in the sharing of our uncertainties and speculations as was appropriate for both the subject matter and the context The workshop was organized of necessity around the experimental work as is this volume Where the theoretical work is directly relevant to particular experiments it is included in the appropriate sections with them Most of the participants felt strongly that magnetic fluctuations played an important role in the mechanism for high  $T_c$  although with the exception of the ILS R work reported by Luke showing results inconsistent with the anyon picture and the work on flux phases by Lederer the mechanism remained an issue in the background A major focus was the phenomenological interpretation of the NMR data

*High-Tc Superconductivity* Aleksandr S. Davydov, Vadim M. Loktev, 2012-12-06 High  $T_c$  Superconductivity is based on a meeting held in Kiev and contains contributions discussing the most recent achievements in this field The book includes reviews and original papers covering theoretical and experimental aspects of the subject Keywords electronic and magnetic properties metallization processes emission and optic spectra levitation pinning frustration and fluctuations thin films

**Applications of Statistical and Field Theory Methods to Condensed Matter** Dionys Baeriswyl, Alan R. Bishop, J. Camelo, 2012-12-06 There is no doubt that we have during the last decade moved into a golden age of condensed matter science The sequence of discoveries of novel new states of matter and their rapid assimilation into experimental and theoretical research as well as devices has been remarkable To name but a few spin glasses incommensurate fractal quasicrystal structures synthetic metals quantum well fabrication fractional quantum Hall effect solid state chaos heavy fermions and most spectacularly high temperature superconductivity This rapid evolution has been marked by the need to address the reality of materials in extreme conditions disordered nonlinear systems in reduced dimensions restricted geometries and at mesoscopic scales often with striking competitions between several length and frequency scales and between strong electron phonon and electron electron interactions In such new territory it is not surprising that very interdisciplinary approaches are being explored and traditional boundaries between subjects and disciplines re defined In theory this is evident for instance in attempts 1 to advance the state of the art for electronic structure calculations so as to handle strongly interacting many body systems and delicate competitions for collective ground states spin models or many electron Hamiltonians field theory band structure quantum chemistry and numerical approaches or 2 to understand pattern formation and complex including chaotic dynamics in extended systems This demands close involvement with applied mathematics numerical simulations and statistical mechanics techniques

Low Dimensional Conductors and Superconductors Union of Yugoslav Societies of Mathematicians, Physicists and Astronomers, 1990

*Magnetic Quantum Oscillations in Low-dimensional Conductors and Superconductors* P. Wyder, T. Maniv, I. D. Vagner, 1993

**Charge Density Waves in Solids** L.P. Gor'kov, G. Grüner, 2012-12-02 The latest addition to this series covers a field which is commonly referred to as charge density wave dynamics The most thoroughly investigated materials are inorganic linear chain compounds with highly anisotropic

electronic properties The volume opens with an examination of their structural properties and the essential features which allow charge density waves to develop The behaviour of the charge density waves where interesting phenomena are observed is treated both from a theoretical and an experimental standpoint The role of impurities in statics and dynamics is considered and an examination of the possible role of solitons in incommensurate charge density wave systems is given A number of ways to describe charge density waves theoretically using computer simulations as well as microscopical models are presented by a truly international board of authors     Semiconductors and Semimetals ,1989-01-09 Semiconductors and Semimetals     *Microscopic Aspects of Nonlinearity in Condensed Matter* Alan R. Bishop,V.L. Pokrovsky,V. Tognetti,2012-12-06 Proceedings of a NATO ARW held in Florence Italy June 7 13 1990     The Hubbard Model Mario Rasetti,1991 This collection of articles provides authoritative and up to date reviews on the Hubbard Model It will be useful to graduate students and researchers in the field

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